



THE PORT AUTHORITY
OF NY & NJ

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Engineering Department
Design Divisions

The World Trade
Center
Electrical/HVAC
Upgrade Program

TOWER ONE AND TWO
LOW VOLTAGE
SUBSTATIONS
CONSTRUCTION AND
INSTALLATION

ELECTRICAL

TYPICAL SUBSTATION
STAGE III
INSTALLATION OF
BUS #1 & 2

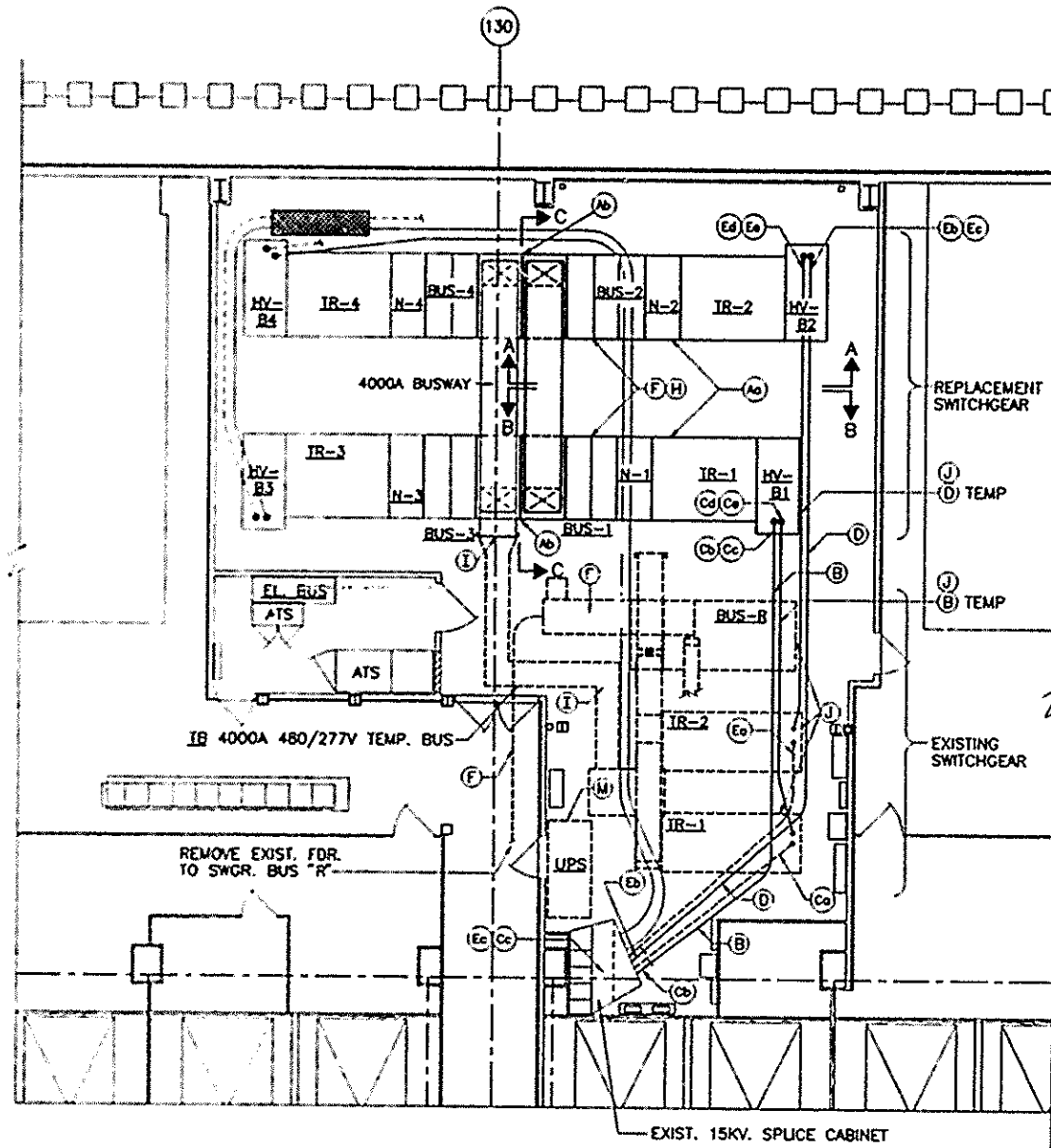
No. Date Revision Approved

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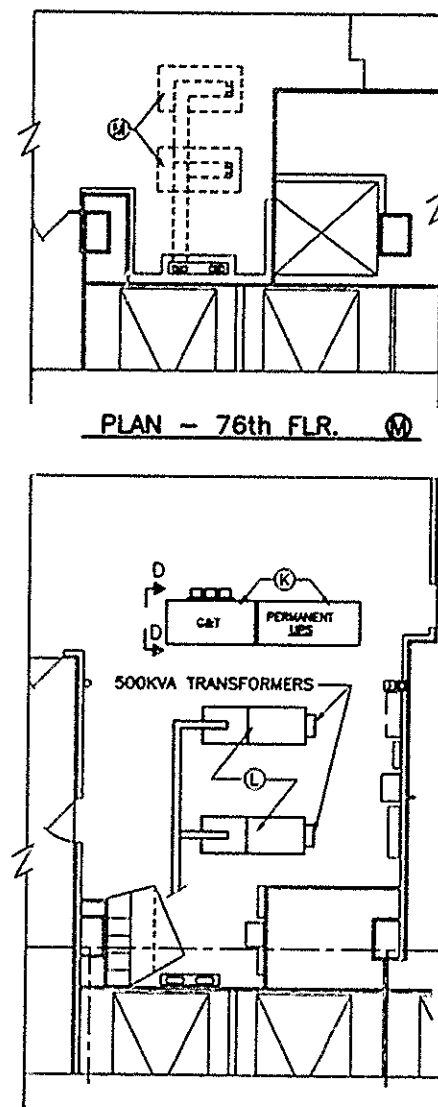
LEAHY/
FISCHER LEAHY A.S.
Designed by Drawn by Checked by

Date 5-1-95 Scale AS NOTED

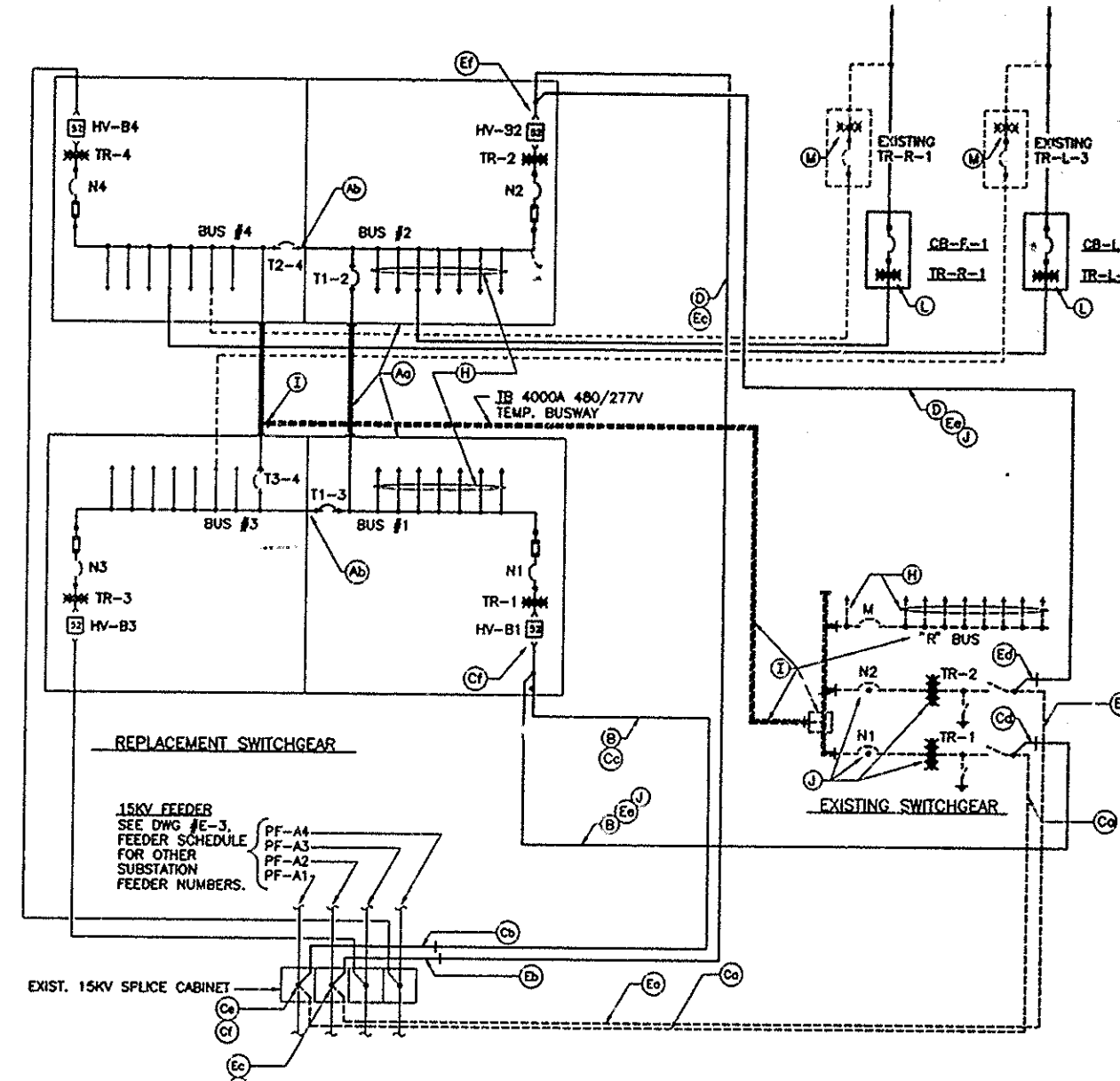
Contract Number Drawing Number
WTC 802.071 E-6



TYPICAL PLAN - SUBSTATION SS-75N
(OTHER SUBSTATIONS SIMILAR)



PLAN - 75th FLR. (K) & (L)



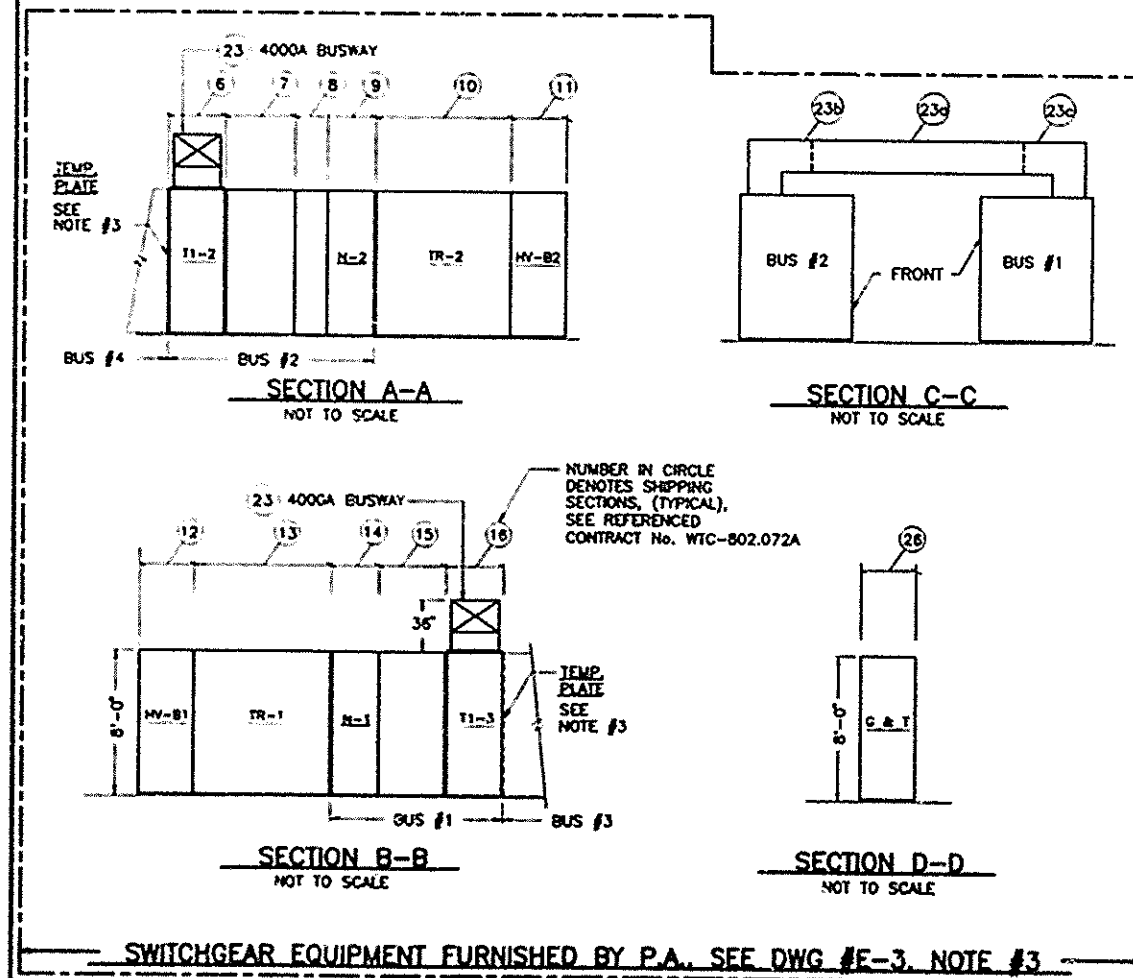
(OTHER SUBSTATIONS SIMILAR)

I HEREBY CERTIFY THAT THIS IS A TRUE AND CORRECT
COPY OF ONE OF THE CONTRACT DRAWINGS CON-
STITUTING A PART OF CONTRACT NO. WTC-802.071
IN THE FORM IN WHICH SAID DRAWINGS EXISTED AT
THE TIME THE SAID CONTRACT WAS EXECUTED BY
THE PARTIES.

DATE 6/21/95 *Santana A. Aslam*
SPEC WRITER
DATE 8/15/95 *Peter L. Sweeney*
ENGINEER OF DESIGN

NOTES:

- FOR LEGEND SEE DWG #E-1, FOR GENERAL NOTES
AND ABBREVIATIONS SEE DWG #E-2.
- THIS DRAWING TOGETHER WITH DWG. #CS-1 DESCRIBES
IN GENERAL THE STAGE III SEQUENCE OF INSTALLATION
FOR A TYPICAL SUBSTATION. FOR DETAILS SEE INDIVIDUAL
SUBSTATION DRAWINGS.
- REMOVE TEMPORARY STEEL PLATE AND INSTALL INSULATION
MATERIAL ON THE TIE BKR #T1-2 PRIOR TO INSTALLATION
OF BUS #2. REPEAT ON THE TIE BKR #T3-4 PRIOR TO
INSTALLATION OF BUS #1.
- PRIOR TO ENERGIZING BUS #1 AND 2 THE CONTRACTOR
SHALL INSTALL THE FOLLOWING:
• ALL CONDUITS ENTERING SWITCHGEAR
• ALL BUSWAY SECTIONS ENTERING SWITCHGEAR
• ALL FEEDERS RUN TO LOADS OR SPlicing POINTS,
EXCEPT THOSE UTILIZING EXISTING FEEDER CONDUITS.
FEEDERS THAT USE EXISTING FEEDER CONDUITS SHALL BE
INSTALLED WITH SWITCHGEAR ENERGIZED.
- ALL ELECTRICAL OUTAGES SHALL BE PERFORMED OUTSIDE
NORMAL BUILDING OPERATING HOURS. SEE SPECIFICATIONS
DIVISION 1 ENTITLED "CONDITIONS AND PRECAUTIONS" FOR
DESCRIPTION OF ELECTRICAL POWER OUTAGE CATEGORIES.



SWITCHGEAR EQUIPMENT FURNISHED BY P.A. SEE DWG #E-3, NOTE #3

SEQUENCE OF INSTALLATION STAGE III (SEE NOTE #2)			
STEP	DESCRIPTION OF WORK	OUTAGE AT SUBSTATION (SEE NOTE #5)	REMARKS
(A)	a. INSTALL BUS #1 & 2 WITH ASSOCIATED EQUIPMENT b. MAKE CONNECTIONS BETWEEN BUS 2 & 4, AND BUS 1 & 3.	- 0 - - 0 -	SEE NOTE #3 & SECTIONS A-A, B-B
(B)	INSTALL CDT. PF-A1 FROM HV-B1 TO EXISTING 15KV. SPLICE CABINET, AND CDT. PF-A1 TEMP. FROM HV-B1 TO EXIST. TR-1.	- 0 - - 0 -	END CDT. SHORT OF SPLICE CABINET & EXIST. TR-1
(C)	a. REMOVE EXIST. PF-A1 CDT & CABLE FROM SPLICE CABINET TO EXISTING SWITCHGEAR. b. EXTEND CDT PF-A1 TO EXISTING 15KV. SPLICE CABINET. c. INSTALL FDR PF-A1 SPLICE & CONNECT. d. EXTEND CDT. PF-A1 TEMP. TO EXIST TR-1 e. INSTALL FDR. PF-A1 TEMP & CONNECT. f. TEST & ENERGIZE FEEDER PF-A1, RE-ENERGIZE EXIST. TR-1.	- 0 - - 0 -	OPEN EXIST. TR-1 NETWORK PROTECTOR & LOCK OUT OF SERVICE. DE-ENERGIZE FDR. PF-A1 & KEEP OUT OF SERVICE FOR DURATION OF STEP C (THE 3 REMAINING FEEDERS WILL SUPPLY 1/2 OF THE TOWER) BKR. HV-B1 TO BE LOCKED OPEN AFTER TEST.
(D)	INSTALL CDT. PF-A2 FROM HV-B2 TO EXISTING 15KV. SPLICE CABINET, AND CDT. PF-A2 TEMP FROM HV-B2 TO EXIST. TR-2.	- 0 - - 0 -	END CDT. SHORT OF SPLICE CABINET & EXIST TR-2.
(E)	a. REMOVE EXIST. PF-A2 CDT & CABLE FROM SPLICE CABINET TO EXISTING SWITCHGEAR. b. EXTEND CDT PF-A2 TO EXIST. 15KV. SPLICE CABINET. c. INSTALL FDR PF-A2 SPLICE & CONNECT. d. EXTEND CDT. PF-A2 TEMP TO EXIST TR-2 e. INSTALL FDR PF-A2 TEMP & CONNECT. f. TEST & ENERGIZE FEEDER PF-A2, RE-ENERGIZE EXIST. TR-2.	- 0 - - 0 -	OPEN EXIST. TR-2 NETWORK PROTECTOR & LOCK OUT OF SERVICE. DE-ENERGIZE FDR. PF-A2 & KEEP OUT OF SERVICE FOR DURATION OF STEP F (THE 3 REMAINING FEEDERS WILL SUPPLY 1/2 OF THE TOWER) BKR. HV-B2 TO BE LOCKED OPEN AFTER TEST.
(F)	COMMISSION BUS #1 & 2 LINE-UPS. (SEE NOTE #4)	B BUS #3 & 4 LOADS OUT	SEE SPEC. SECTION 16999 FOR COMMISSIONING PROCEDURE
(G)	a. OPEN EXIST. TR-1 NETWORK PROTECTOR AND PRIMARY DISC. SW. - CLOSE BKR. HV-B1. b. (REPEAT a. FOR EXIST. TR-4 & HV-B4)	- 0 - - 0 -	NEWLY INSTALLED EQUIP. WILL SUPPLY LOADS WITH EXIST. TR-1 & TR-2 ACTING AS BACK-UP.
(H)	TRANSFER LOADS FROM EXIST. "R" BUS TO BUS 1 & 2, REMOVE FDR'S	A, B OR C NO POWER TO LOADS BEING TRANSFERRED	APPROX. 11 LOADS
(I)	DISCONNECT TEMP. BUSWAY, DE-ENERGIZING EXIST. "R" BUS, CAP 4000A. BUSWAY	A OR B BUS #4 LOADS OUT	OPEN N4, T2-4 & T3-4
(J)	REMOVE FDR'S PF-A1 TEMP. & PF-A2 TEMP. REMOVE EXIST. "R" BUS. TRANSFORMER #TR-1 & TR-2 WITH ASSOCIATED EQUIPMENT.	C - 0 -	SAME REMARK AS (G) & (H) ABOVE
(K)	INSTALL G & T CUBICLE & PERMANENT UPS.	- 0 - - 0 -	
(L)	INSTALL TRANSFORMERS R-1 & L-3 WITH ASSOCIATED EQUIPMENT	C 208/120V. BUSWAY	SEE DWG #E-106
(M)	REMOVE EXIST. TRANSFORMERS R-1 & L-3 PATCH FLOOR REMOVE TEMP. UPS.	- 0 - - 0 -	SEE DWG #E-106